



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/840,235	04/24/2001	Penny G. Warren	N.C.82,413	3487
26384	7590	02/18/2004	EXAMINER	
NAVAL RESEARCH LABORATORY ASSOCIATE COUNSEL (PATENTS) CODE 1008.2 4555 OVERLOOK AVENUE, S.W. WASHINGTON, DC 20375-5320			LAROSE, COLIN M	
		ART UNIT	PAPER NUMBER	
		2623	DATE MAILED: 02/18/2004	

5

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/840,235	WARREN ET AL.	
	<b>Examiner</b> Colin M. LaRose	<b>Art Unit</b> 2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-23 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____ .  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date 4. | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|  | 6) <input type="checkbox"/> Other: _____ .                                  |

## **DETAILED ACTION**

### ***Claim Objections***

1. The following sections of 37 CFR §1.75(a) and (d)(1) are the basis of the following objection:

(a) The specification must conclude with a claim particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention or discovery.

(d)(1) The claim or claims must conform to the invention as set forth in the remainder of the specification and the terms and phrases used in the claims must find clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description.

2. Claims 1-13 are objected to under 37 CFR §1.75(a) and (d)(1) as failing to particularly point out and distinctly claim the subject matter that the applicant regards as the invention.

Claim 1 calls for:

“An image processing apparatus ... comprising:  
... a registration algorithm ... and a color fusion algorithm ...”

The claim is indefinite because “algorithms” do not denote structure. A suggested correction is to claim processors operative to execute the algorithms.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-7, 10, 13-20, and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,555,324 by Waxman et al. ("Waxman").

Regarding claims 1 and 14, Waxman discloses an image processing apparatus/method (figure 6) for processing imaging data in a plurality of spectral bands and fusing the data into a color image, comprising:

one or more image sensors (310 and 312);

at least two image-acquiring sensor areas located on said one or more imaging sensors (i.e. a first sensor area on camera 310 and a second sensor area on camera 312), wherein each said sensor is sensitive to a different spectral band than at least one other of said sensor areas (sensor for camera 310 is sensitive to visible-near IR spectral band, and sensor for camera 312 is sensitive to long-wave IR spectral band) and generates an image output representative of an acquired image in the spectral band to which the sensor area is sensitive (sensors for cameras 310 and 312 produce visible/near IR and long-wave IR images, respectively);

a registration algorithm for scaling and registering said image outputs (360 and 362); and

a color fusion algorithm for combining said image outputs into a single image (center-surround shunt algorithm performed by processors 130, 132, and 134 combines the two images to create a single RGB image).

Regarding claims 2 and 15, Waxman discloses a frame grabber (cameras 310 and 312).

Regarding claims 3 and 16, Waxman discloses the algorithms are resident programs in a central processor (processor 330, figure 4).

Regarding claims 4 and 17, Waxman discloses a screen display (332, figure 4).

Regarding claims 5 and 18, Waxman discloses an operator interface for allowing operator input in processing of said image outputs (column 15, lines 33-37: user input is allowed for selecting a color mapping).

Regarding claims 6 and 19, Waxman discloses the color fusion algorithm is SCF (figure 6: Waxman uses RGB color codes based on the wavelengths).

Regarding claims 7 and 20, Waxman discloses the color fusion algorithm is PCCF (column 3, lines 28-43: RGB color codes are converted to the HVS color space).

Regarding claim 10, Waxman discloses the apparatus acquires images in real-time (i.e. cameras 310 and 312 capture real-time sequences of images).

Regarding claims 13 and 23, Waxman discloses the processing and fusing occurs in real time (column 11, lines 1-4).

#### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out

Art Unit: 2623

the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Waxman.

Regarding claim 8, Waxman discloses performing a PCCF algorithm (i.e. converting RGB to HVS values) in order to perform “desirable color manipulations” within the HVS space (column 15, lines 5-21). Processor 520, figure 10, is capable of performing color transformations to produce desirable effects on the image to be displayed. Waxman does not disclose desaturating the HVS image, since Waxman’s shunting algorithms produce images that are typically unsaturated (column 8, lines 48-51). However, should the final color image be saturated, it would have obvious to utilize processor 520 to desaturate the HVS image using any of the well-known desaturation techniques in order to enhance the image for display. Official notice taken.

8. Claims 9, 11, 12, 21, and 22 rejected under 35 U.S.C. 103(a) as being unpatentable over Waxman in view of U.S. Patent 6,597,807 by Watkins et al. (“Watkins”).

Regarding claim 9, Waxman discloses using a pair of sensors in cameras 310 and 312. However, Waxman is silent to including an additional (third) sensor.

Watkins discloses a similar system for fusing image data received from multiple sensor that are sensitive to different spectral ranges. In particular, Watkins discloses an embodiment that utilizes three sets of stereo sensor pairs, wherein each pair is sensitive to different spectral ranges (column 2, lines 32-43). Then, the images are fused together to form a single RGB image.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Waxman by Watkins to achieve the claimed invention since utilizing three sensors, as taught by Watkins, provides more information of an imaged scene than utilizing only two sensors.

Regarding claims 11 and 21, Waxman discloses using a pair of sensors in cameras 310 and 312, wherein each sensor maps its image to an associated color channel, and then the channels are combined into a color image. However, Waxman is silent to the plurality of sensors comprising three sensors.

Watkins discloses a similar system for fusing image data received from multiple sensor that are sensitive to different spectral ranges. In particular, Watkins discloses an embodiment that utilizes three sets of stereo sensor pairs, wherein each pair is sensitive to different spectral ranges (column 2, lines 32-43). Then, the images are fused together to form a single RGB image.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Waxman by Watkins to achieve the claimed invention since utilizing three sensors, as taught by Watkins, provides more information of an imaged scene than utilizing only two sensors.

Regarding claims 12 and 22, Waxman discloses the first sensor is sensitive to the visible spectral band (310, figure 6), the second sensor is sensitive to the long-wave IR spectral band (312, figure 6), and Watkins discloses a third sensor is sensitive to the short-wave spectral band (column 2, lines 41-43).

Art Unit: 2623

***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

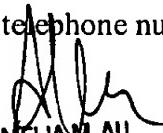
U.S. Patent 6,009,340 by Hsia (column 4, lines 64+)

U.S. Statutory Invention Registration H1599 by Task et al.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Colin M. LaRose whose telephone number is (703) 306-3489. The examiner can normally be reached Monday through Thursday from 8:00 to 5:30. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au, can be reached on (703) 308-6604. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the TC 2600 Customer Service Office whose telephone number is (703) 306-0377.



AMELIA M. AU  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2600

CML

Group Art Unit 2623

2 February 2004